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Development of cesium-free negative hydrogen ion source by using sheet plasma TAKUYA HASE, TAKAAKI IIJIMA, YUTA TANAKA, TOSIKIO TAKIMOTO, AKIRA TONEGAWA, KOHNOSUKE SATO, KAZUTAKA KAWAMURA, Department of physics, school of science, Tokai University
— We demonstrated the production of hydrogen negative ions in cesium-free discharge by using the magnetized sheet plasma. Plasma crossed with a vertical gas flow system and extracting H^- beams from the sheet plasma. Under a secondary hydrogen gas entering the hydrogen plasma, the peak position of the hydrogen plasma is localized in the periphery of the sheet plasma. The maximum negative ion beam is successfully extracted using grids located in the periphery of the sheet plasma. The extraction current density is about 8 mA/cm^2 at extraction voltage is 2 kV and discharge current of 30 A. The extraction negative ion current density is saturated at the extraction voltage is 2 kV for the limit of the negative ion density in the periphery region of the sheet plasma. On the other hand, the extraction current is saturated (3 mA/cm^2) with increasing extraction voltage and the negative ions are not detected without the secondary gas flow (0 sccm). This curve depends on the electrons present. Therefore, it is considered that the negative ion current against the extraction current is around 60% from the ratio of the extraction current and the extraction electron current.

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